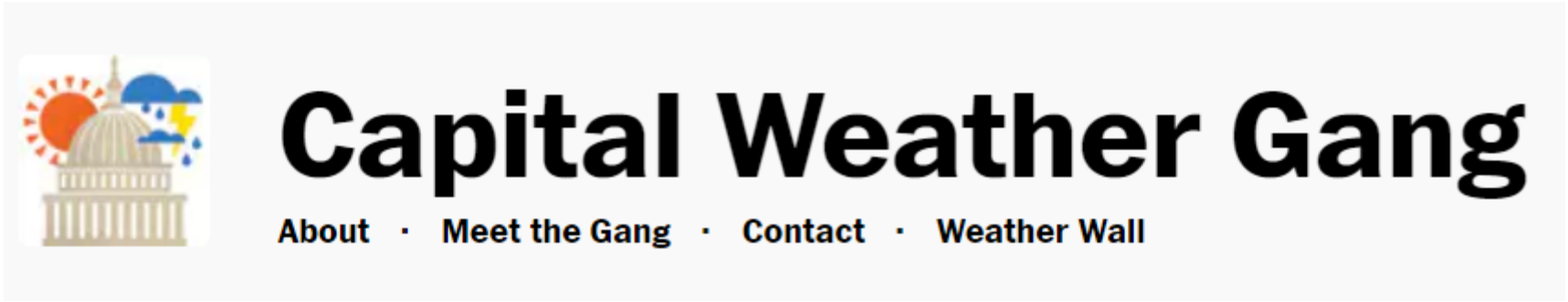
Washington D.C. weather and climate: Trends and projections

Salwan Georges

Jason Samenow
November 16, 2021

The Washington Post

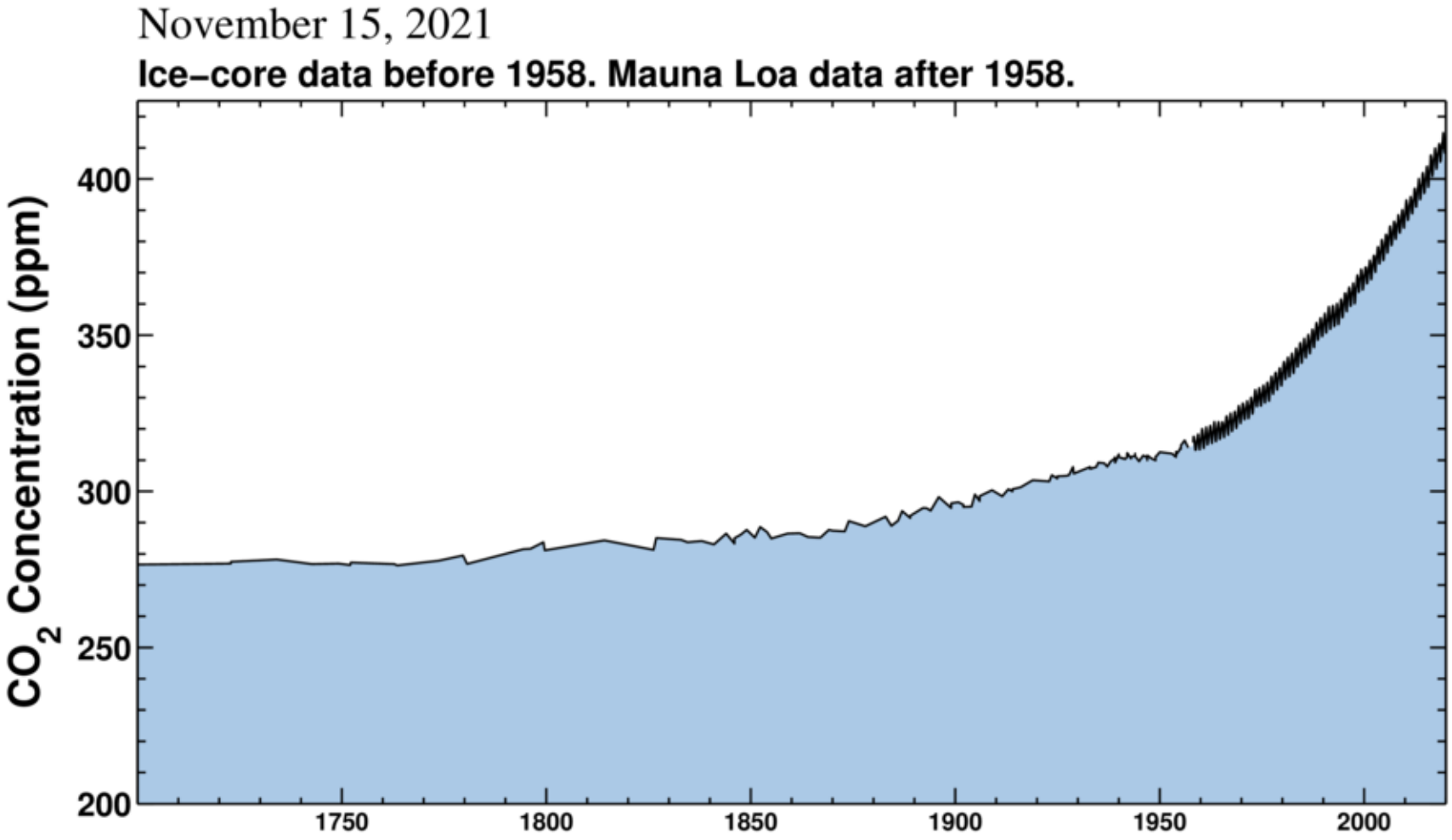


- Washington Post's weather team
- Content spans web, social media, print, radio (WAMU 88.5) & video
- Broad mix of content
  - DC forecasts
  - Weather science and history
  - National weather
  - International weather
  - Climate change
- Emphasis: Reader engagement, communicating uncertainty

http://www.washingtonpost.com/capitalweathergang

WHAT'S HAPPENING NOW

Atmospheric carbon dioxide

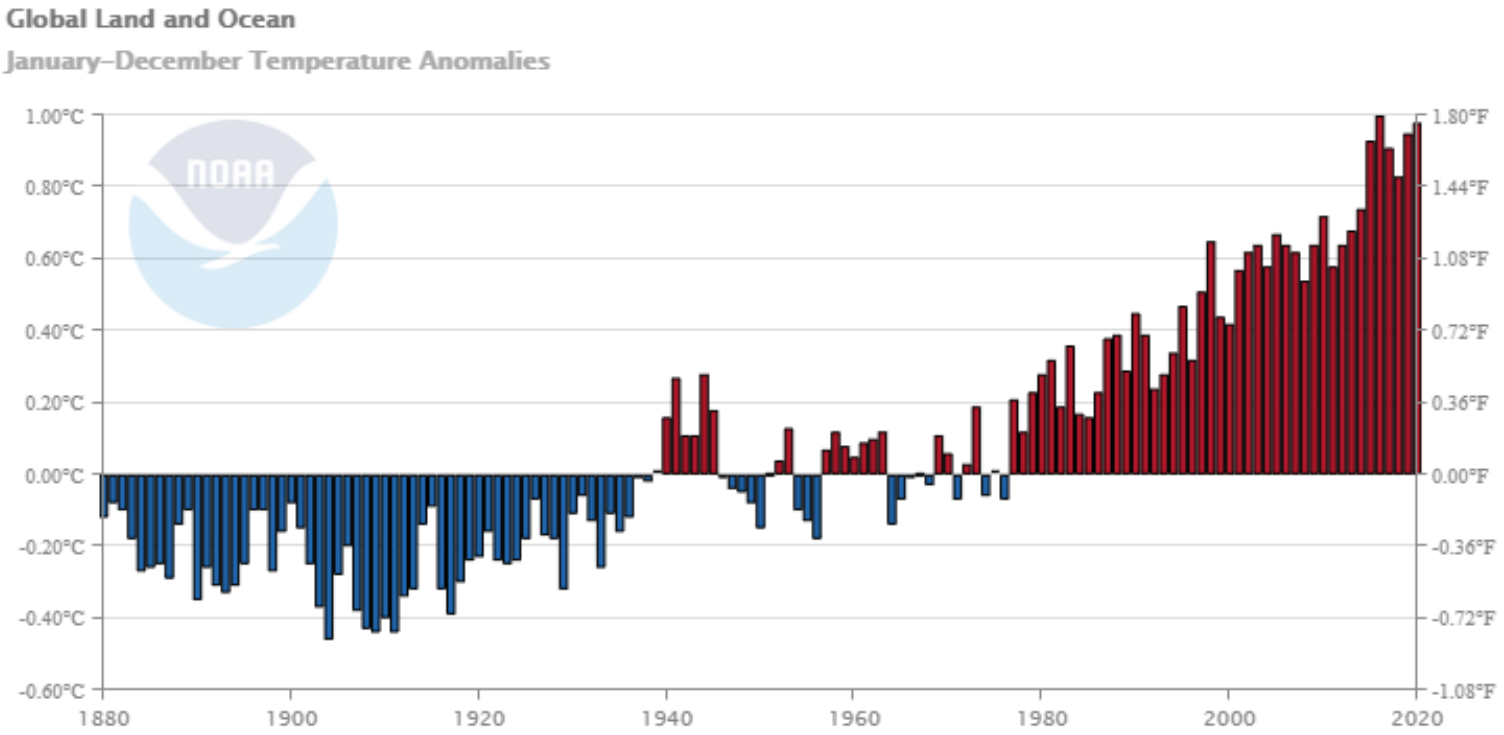


(SCRIPPS)

Global temperatures are rising

Seven warmest years since 2014

2020: 44 straight years warmer than 20th century average

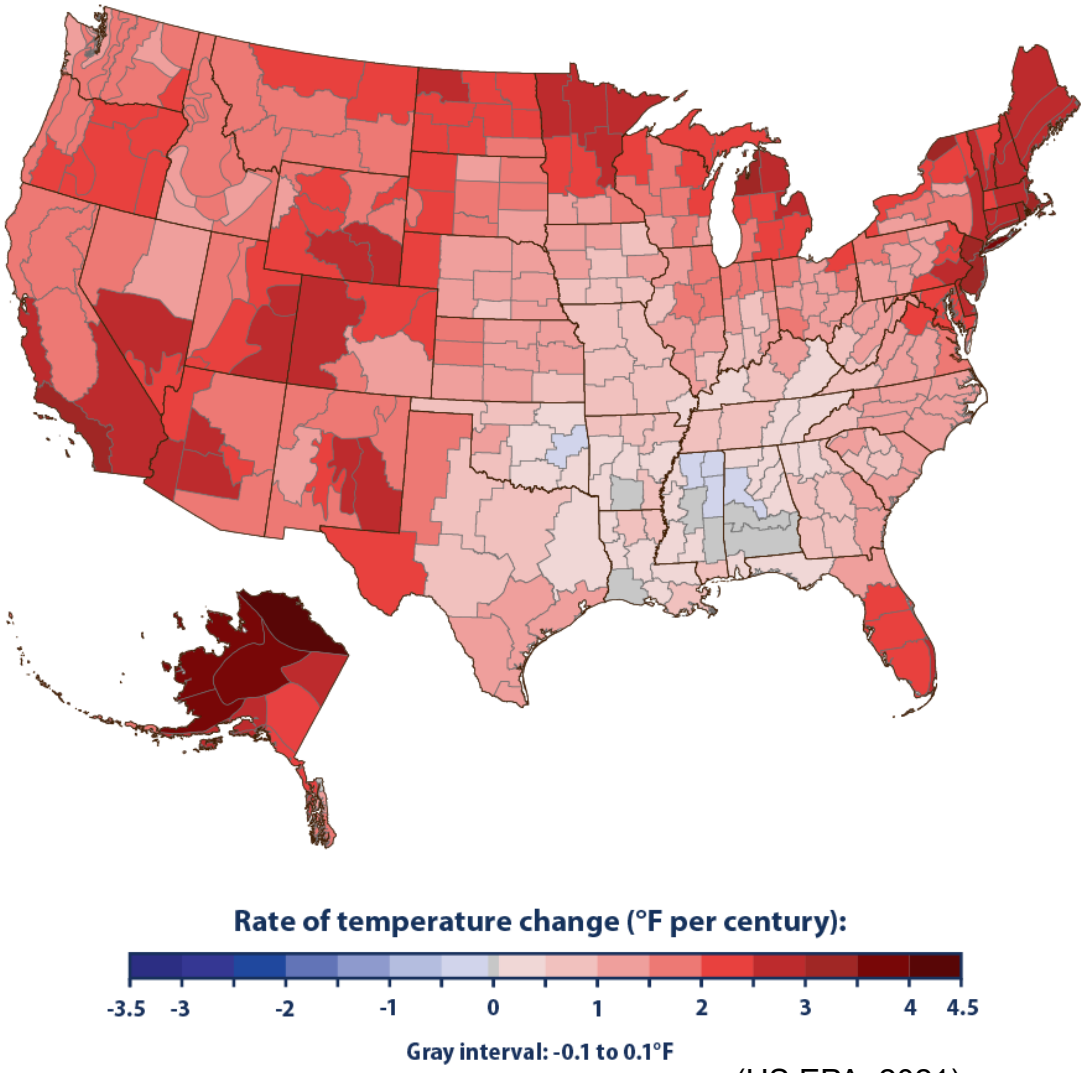


(NOAA, 2021)

U.S. temperatures are rising

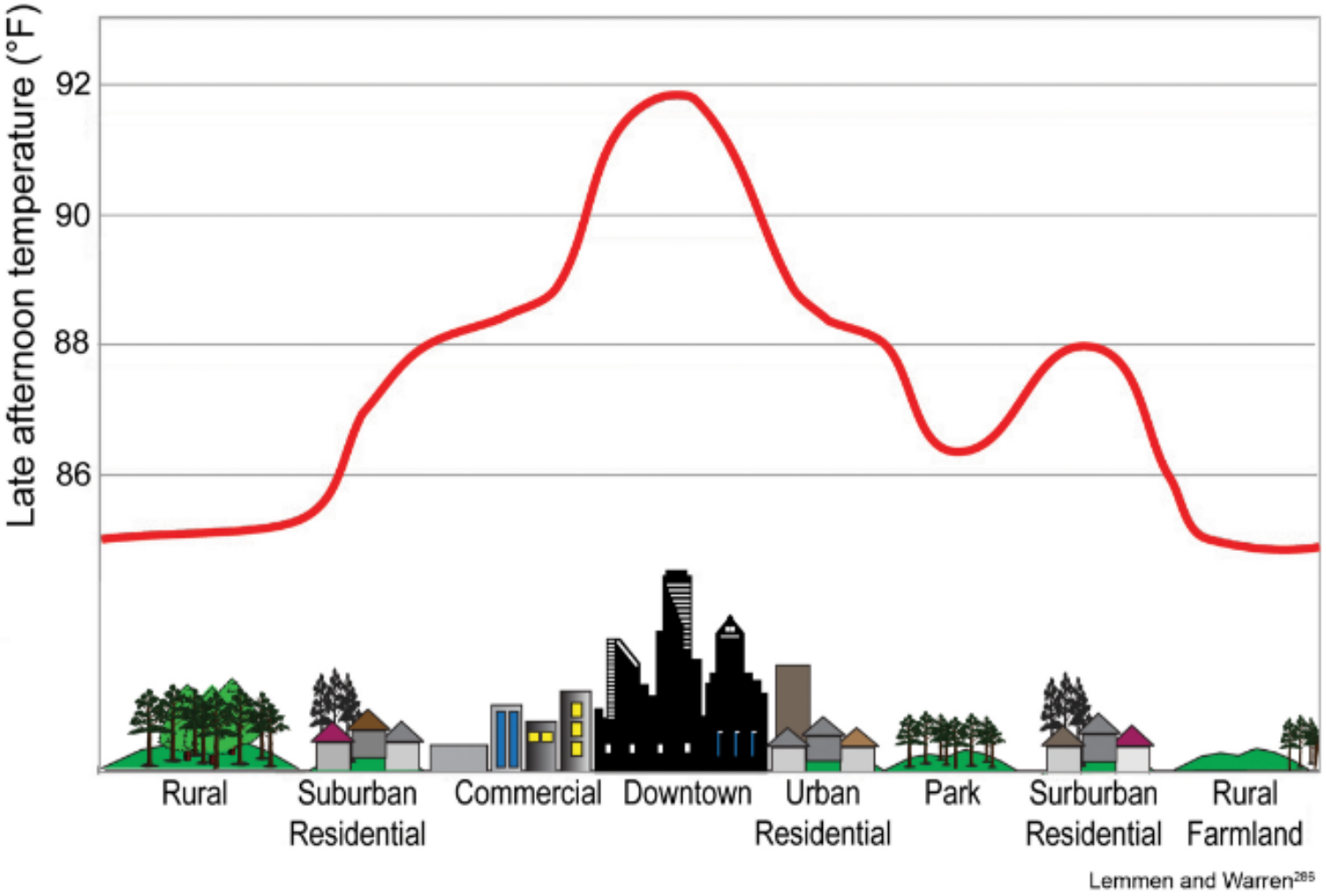
8 of top 10 warmest years since 1998; 2012 and 2016 warmest

23 straight years above normal temps

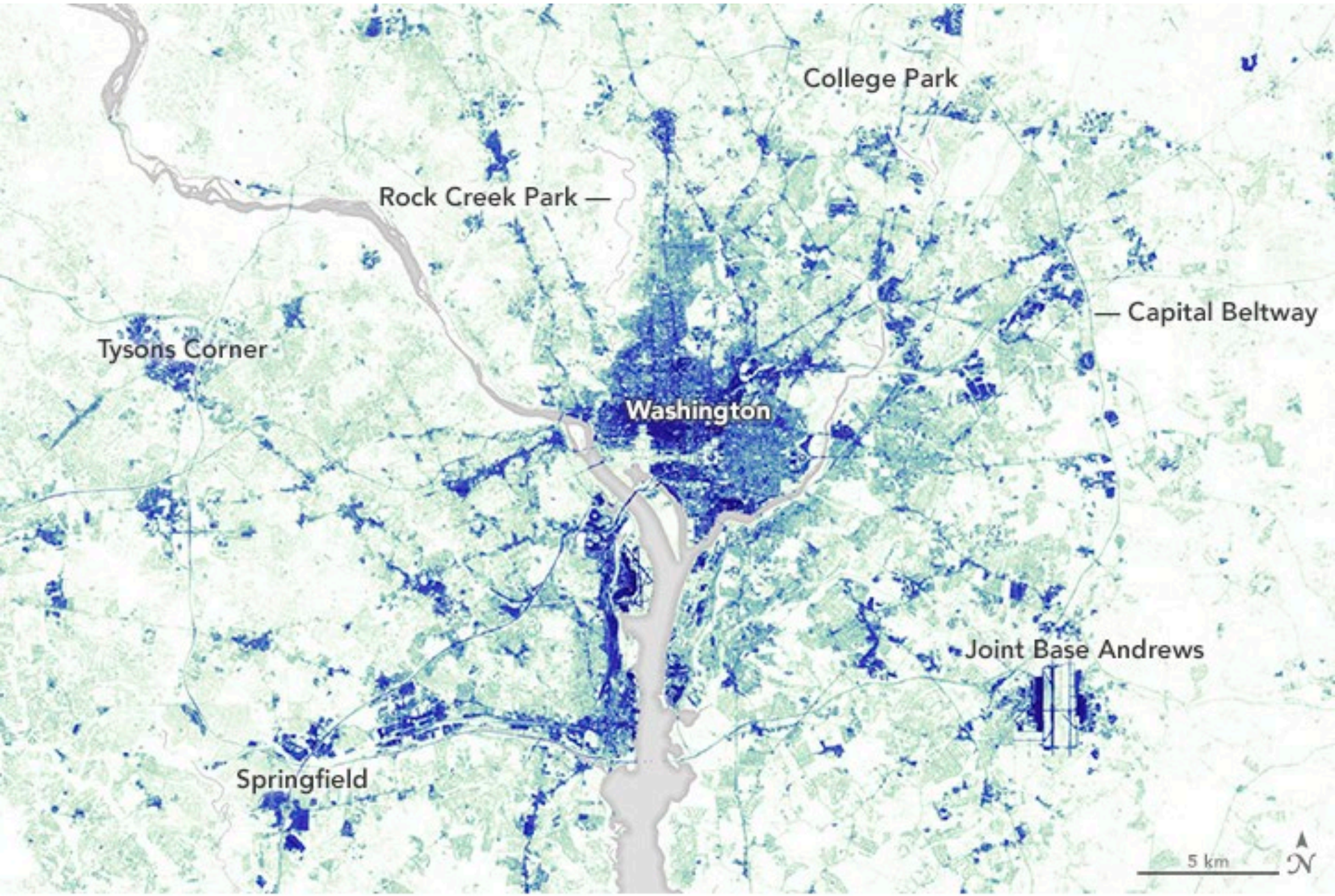


(US EPA, 2021)

Growing urban heat islands

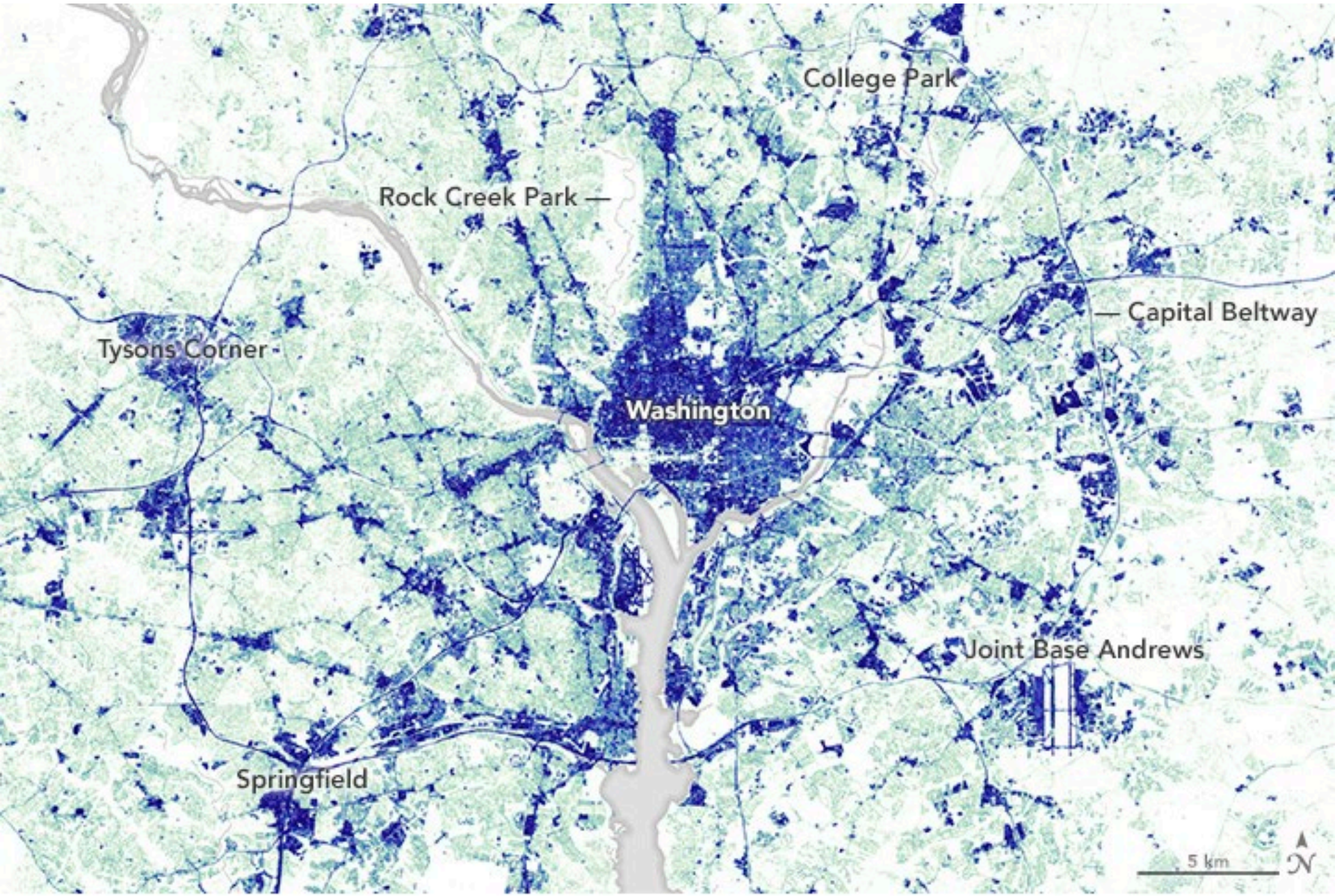


(Via US EPA)


College Park
Rock Creek Park
Capital Beltway
Tysons Corner
Washington
Joint Base Andrews
Springfield
5 km
N
Impervious Surface Area (%)
0
25
50
75
100

1984

(NASA)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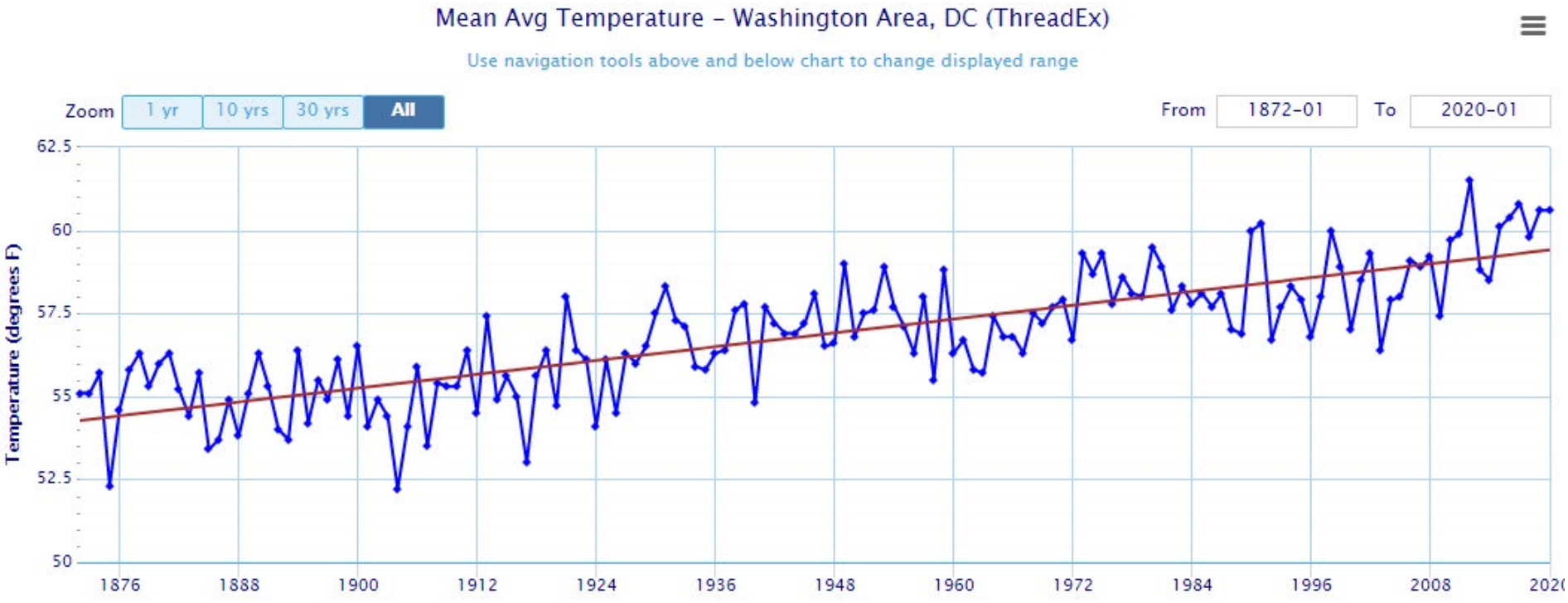
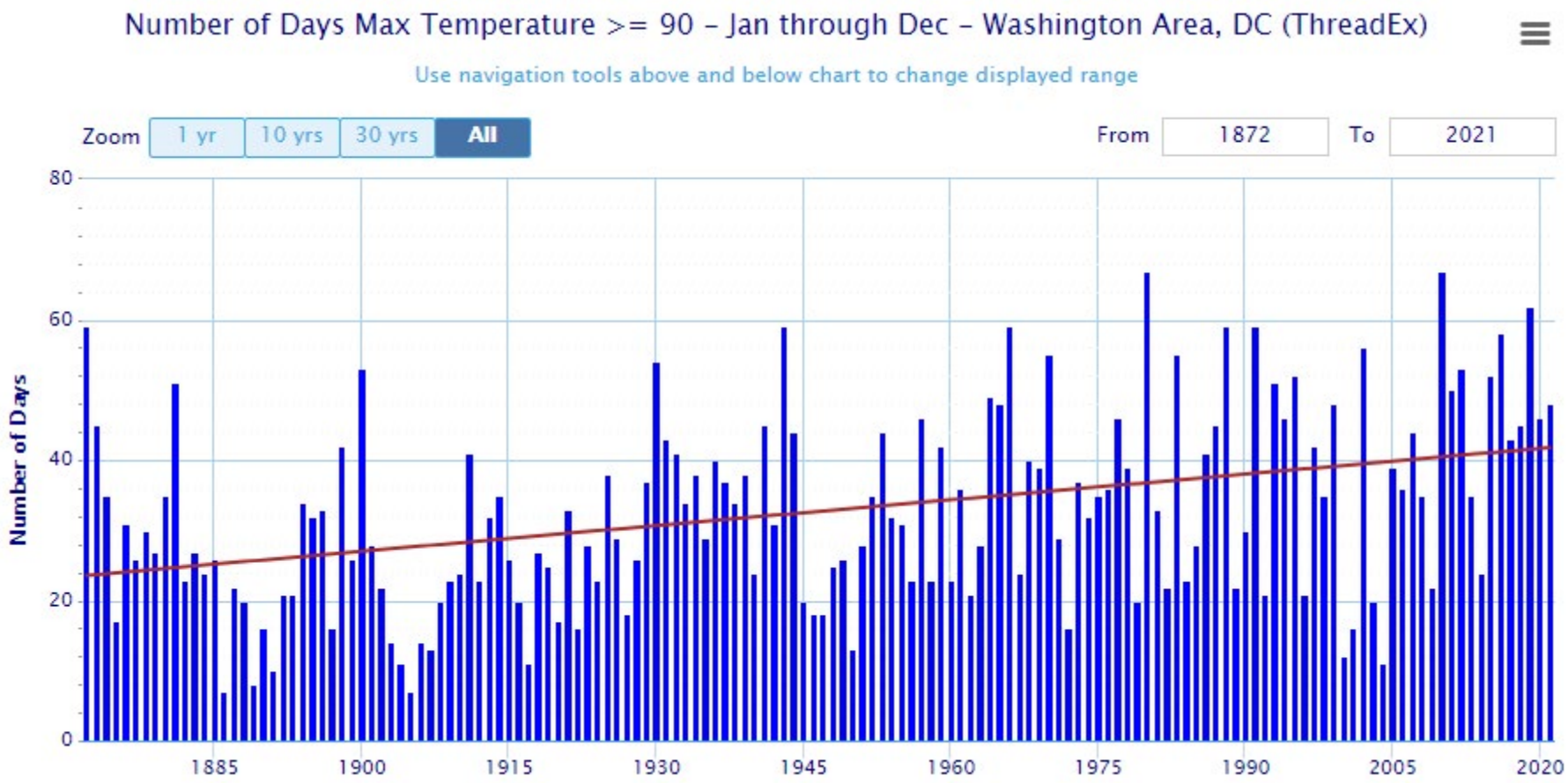
2010

(NASA)

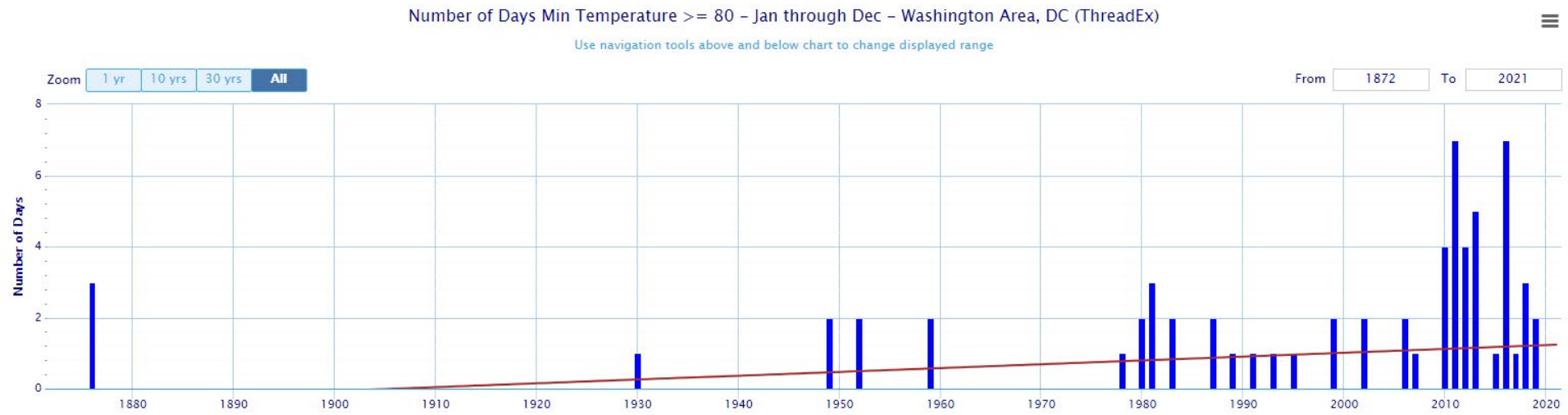
Washington's temperatures on the rise



Hot days are increasing



Extremely warm nights are increasing dramatically



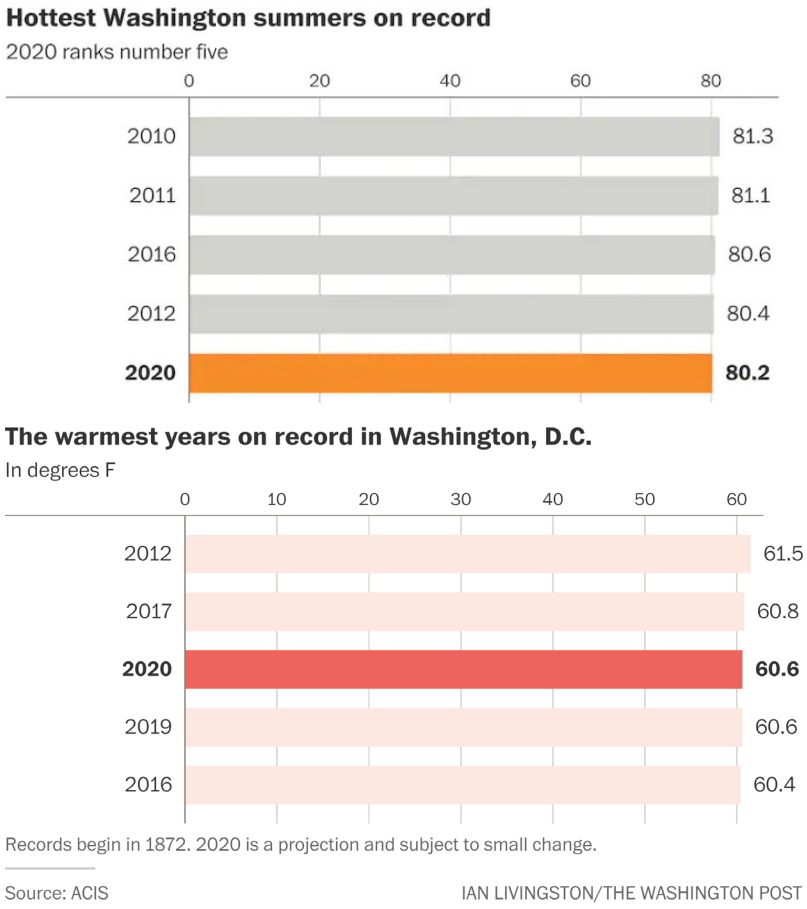
Nights with lows 80 degrees or higher:

- 1872 to 1999: 26 instances of lows above 80 degrees
- 2000-2009: 5 instances
- 2010-2021: 34 (52 percent of total)

The heat keeps coming

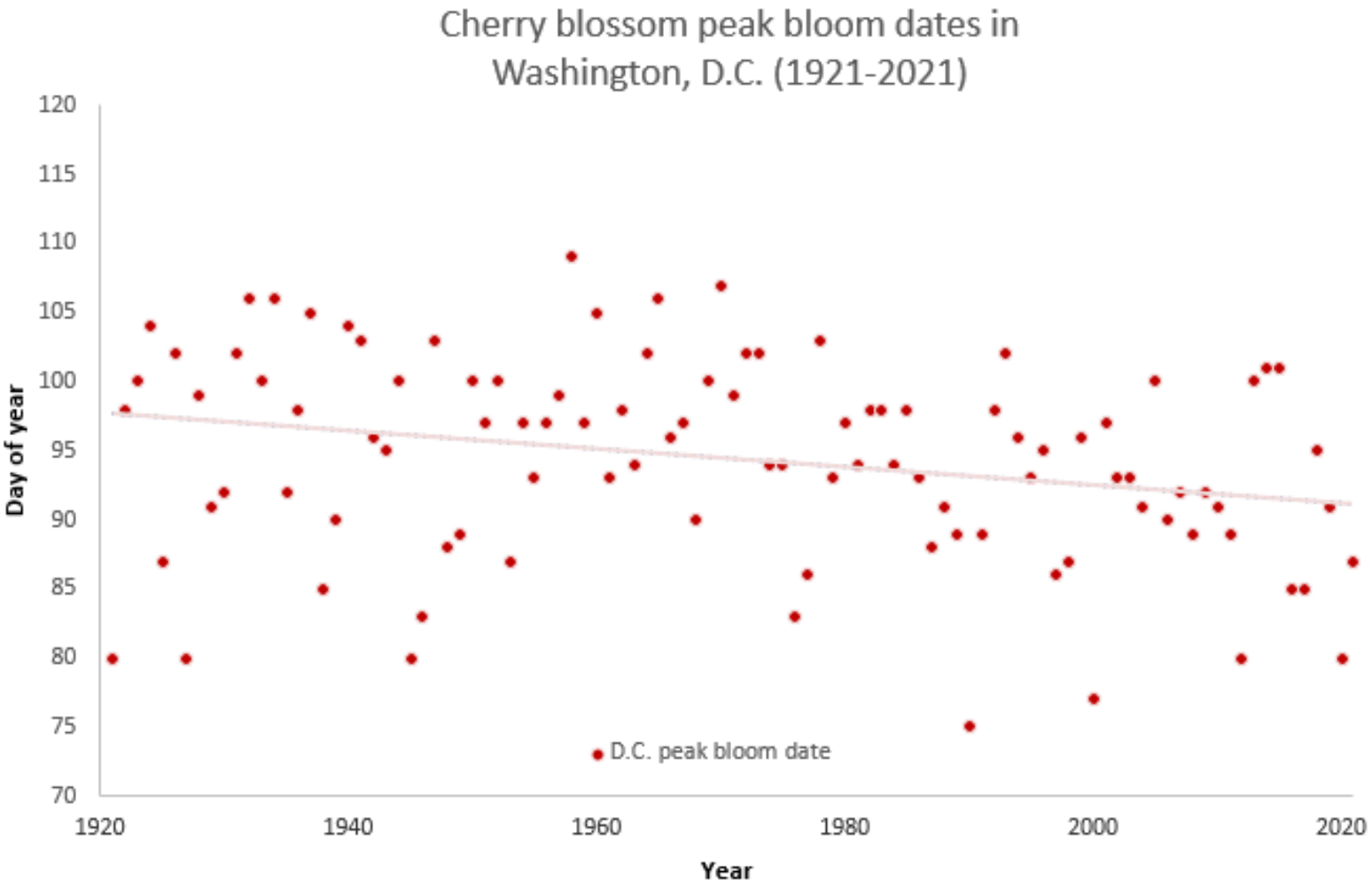
Since 2010, the District has experienced:

- Warmest three years on record (2012, 2017, 2020)
- Top two warmest springs (2012, 2010)
- Hottest five summers (2010, 2011, 2016, 2012, 2020)
- Warmest fall (2016)
- Third warmest winter (2012)
- Warmest February (2017)
- Warmest March (2012)
- Warmest April (2017)
- Warmest May (2015)
- Two of the top four hottest Junes (2010, 2011)
- Hottest four Julys (2011, 2012, 2020, 2010)
- Warmest December (2015)
- Earliest 80-degree reading in calendar year (2018)
- Hottest two June days (104 in 2012, 102 in 2011)
- Earliest 100-degree reading in a day (2010)
- Longest stretches of temperatures above 70 (2016), 80 (2013), and 100 (2010) degrees
- Most lows of 70 degrees or higher (91 in 2018)
- Most 100-degree days in a month (7 in 2012)
- Tie for most consecutive days at 100 (4 in 2012)
- Tie for most 90+ days in a year (67 in 2010)
- Tie for most 95+ days in a year (28 in 2012)
- Tie for most 80+ days in a year (136 in 2018)
- At least 50 90+ days for three straight years (2010, 2011, 2012), first time on record
- Hottest days so early (102 in June 2011) and late (99 in Sept. 2010, 98 in Oct. 2019) in the season
- Earliest last freeze (Feb. 2010)
- Second longest freeze-free period (2010)
- Third latest first freeze (Dec. 2011)
- Longest January freeze-free period (2017)
- Warmest low winter temperatures (2019-20, 2020-21)



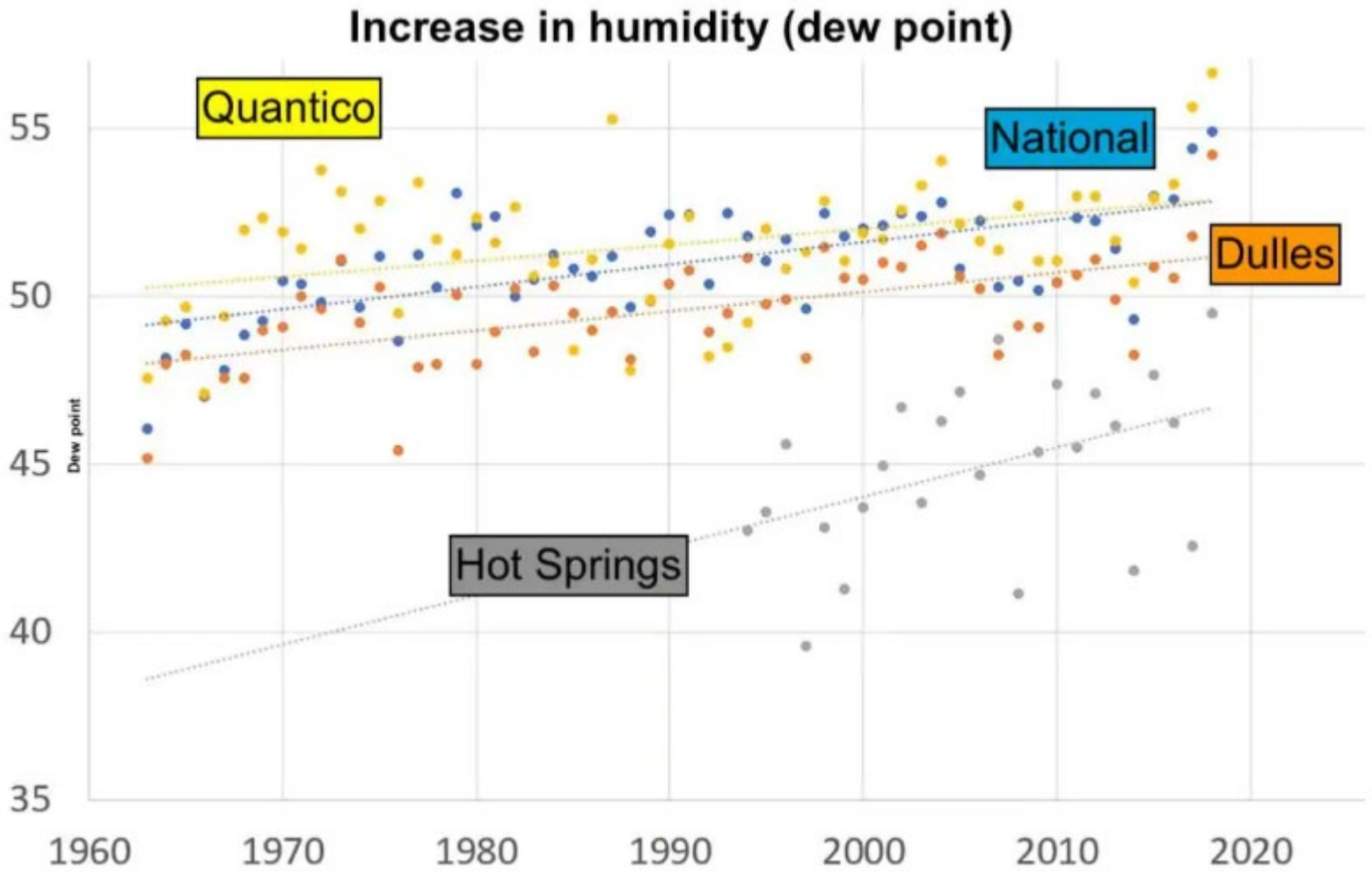
(Records date back to 1871-1872)

Cherry blossoms blooming earlier

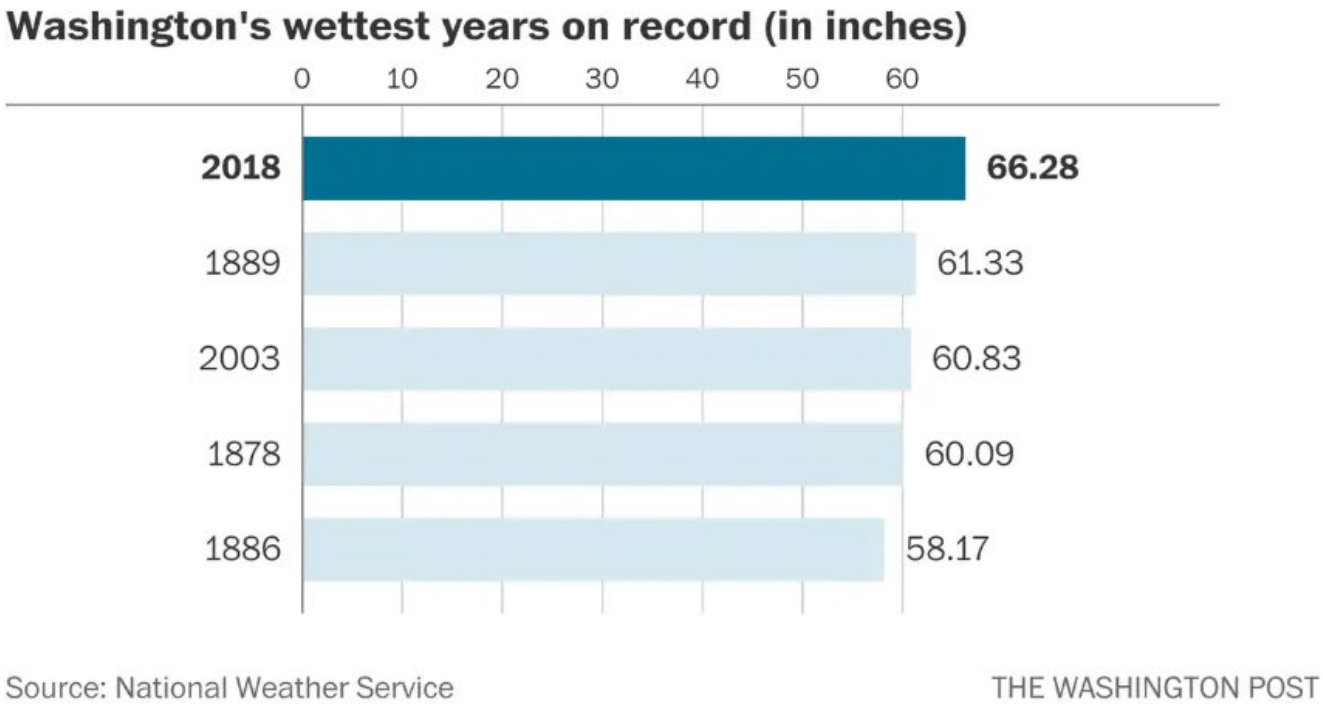


Trends in rain and snow

5 to 10 percent increase in humidity since 1970

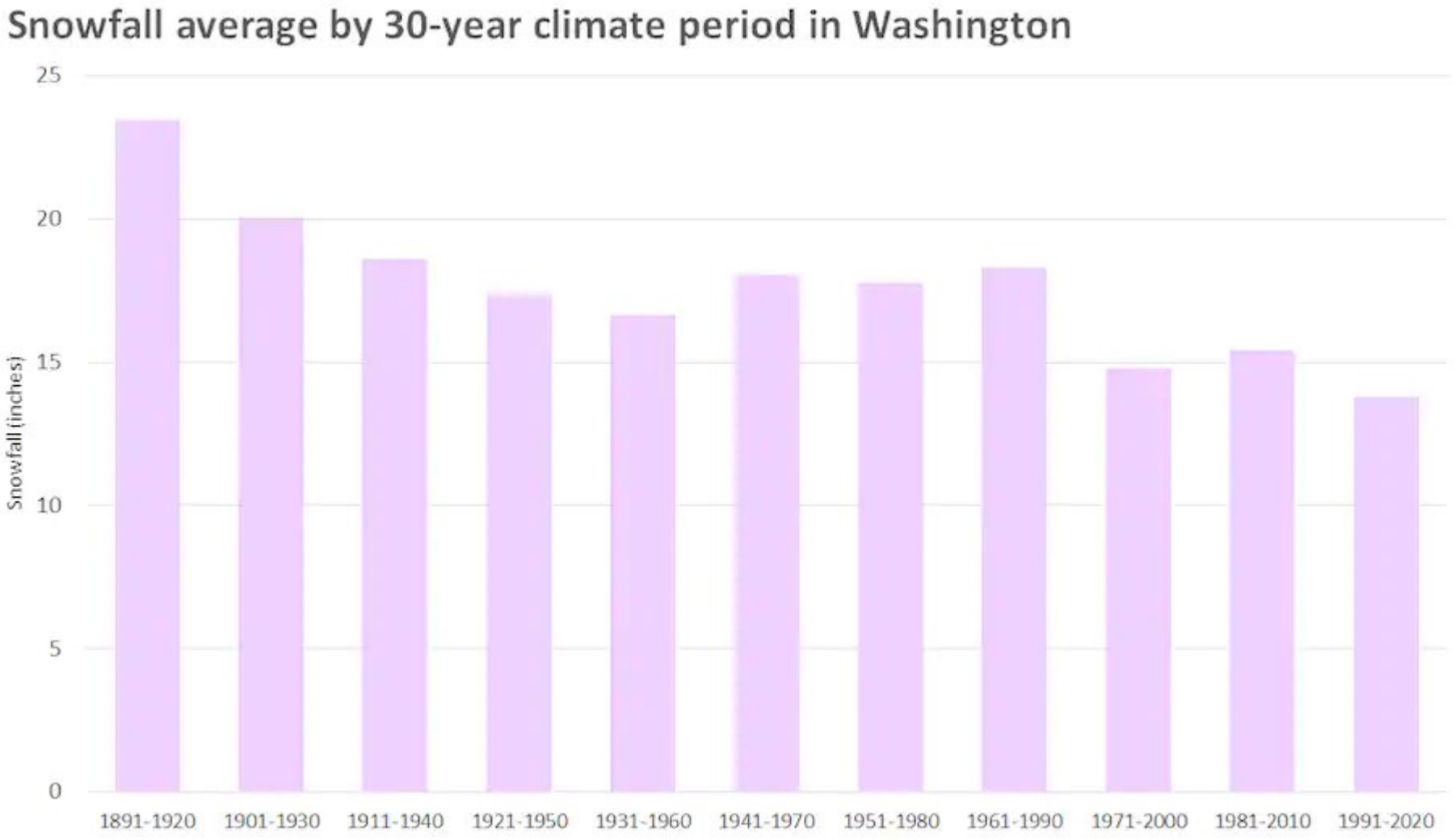


2018: Washington's wettest year



- 2018 included record 24 days with at least an inch of rain.
- In 2019: 3.3" of rain in one hour on July 7
- In 2020: record 7 days with at least 2 inches of rain. 7th wettest year.
- Exceptional floods in Ellicott City in 2016 and 2018

Average snowfall is declining



Sea level rise

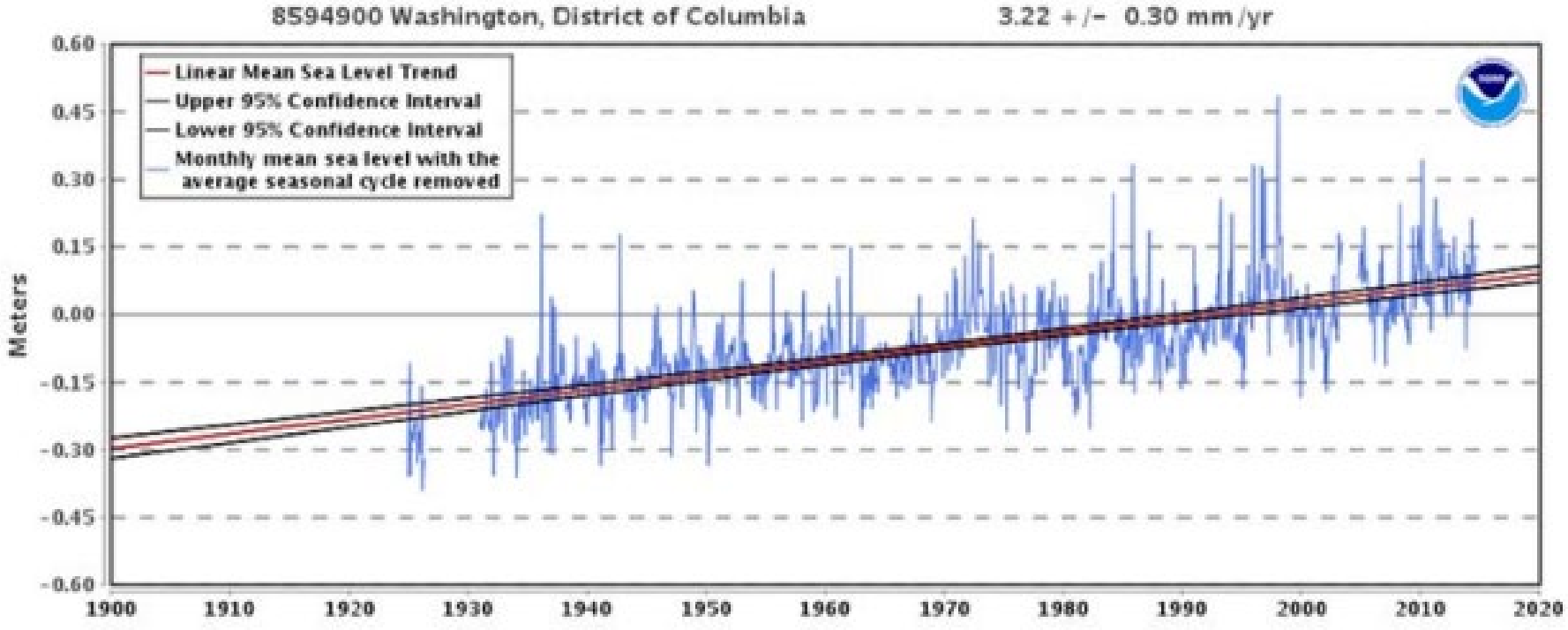


FIGURE 10: Relative Sea Level Rise (RSLR) at Washington, DC waterfront. NOAA gauge 8594900 in Washington Channel. (Source: http://tidesandcurrents.noaa.gov)

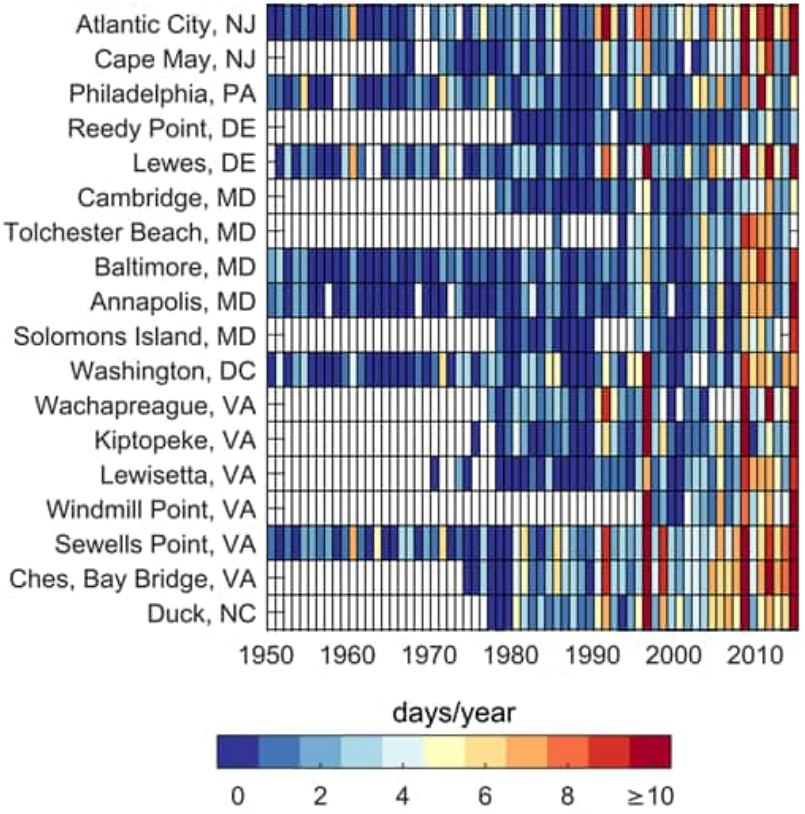
Coastal flooding

NOAA: “Decadal trends in annual flood frequencies are accelerating.”

300% increase in the incidence of nuisance flooding in the District in the last 90 years (NOAA, 2014)

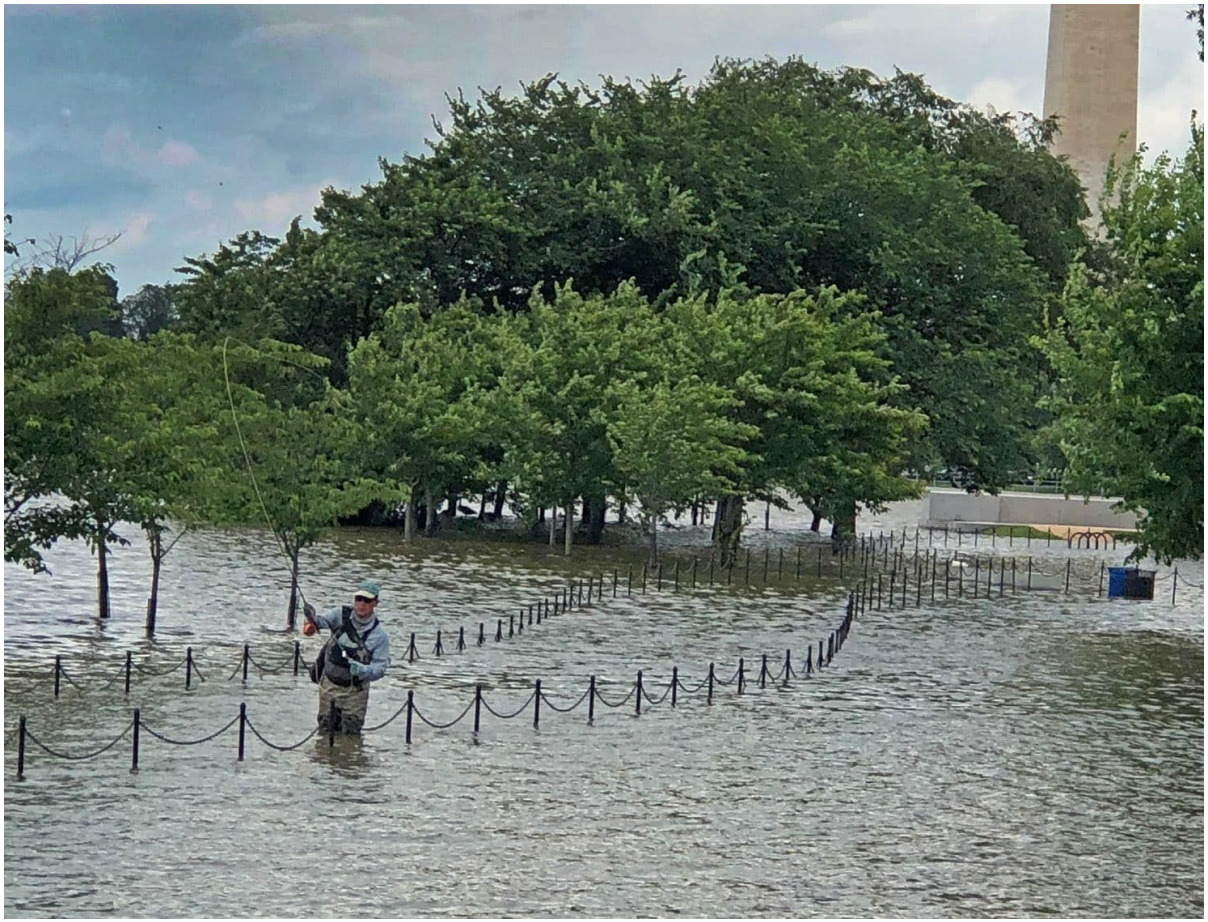
Salwan Georges

Annual number of high tide floods (days per year) at NOAA tide gauge locations.



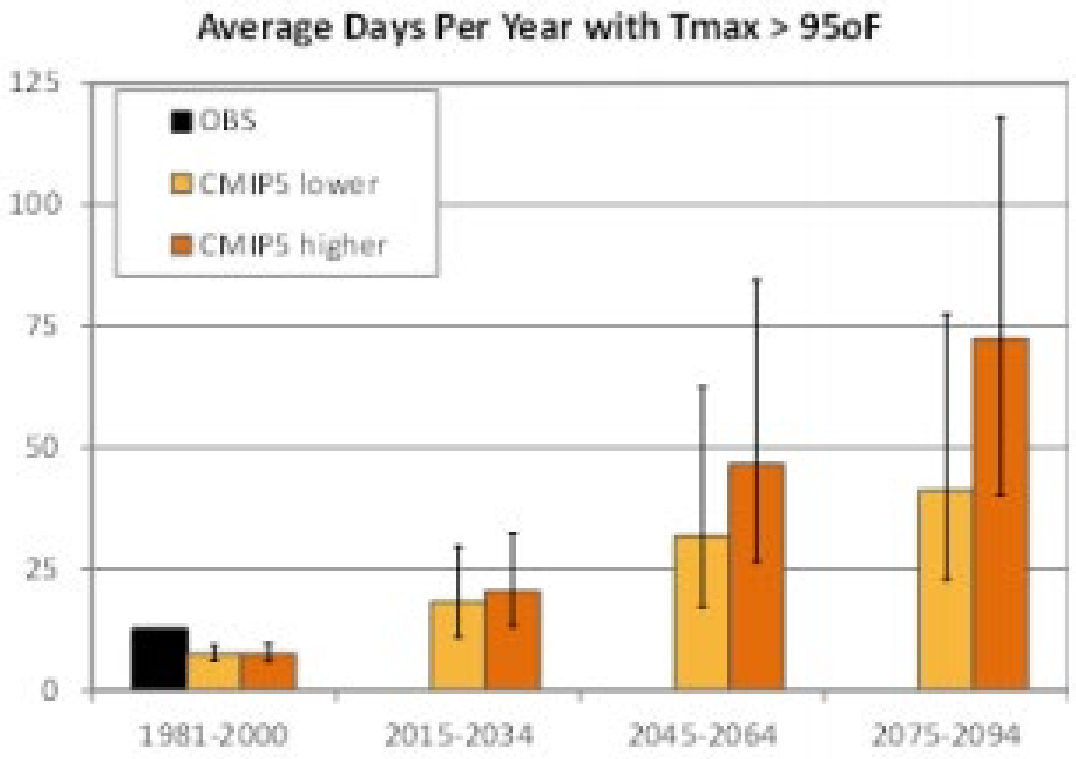
(NOAA, 2018)

THE FUTURE



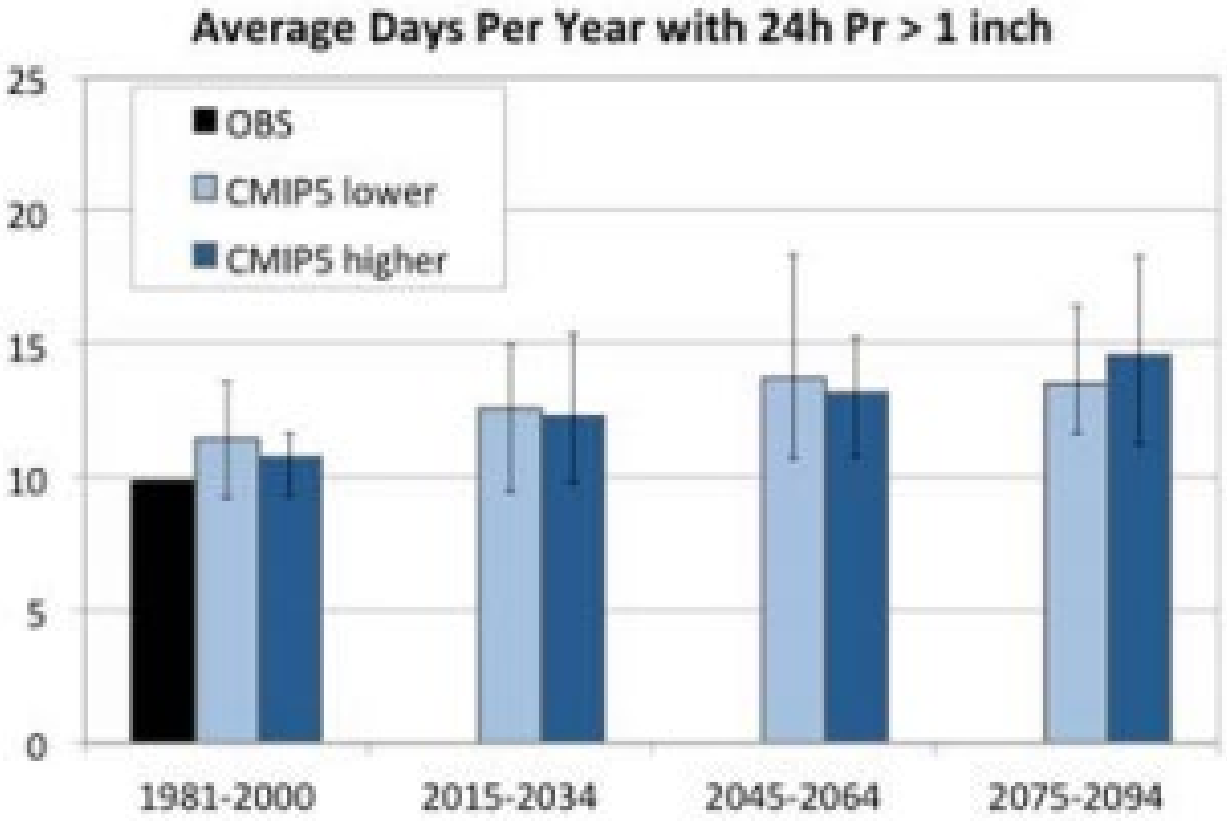
Loic Pritchett, June 5, 2018

MORE HEAT



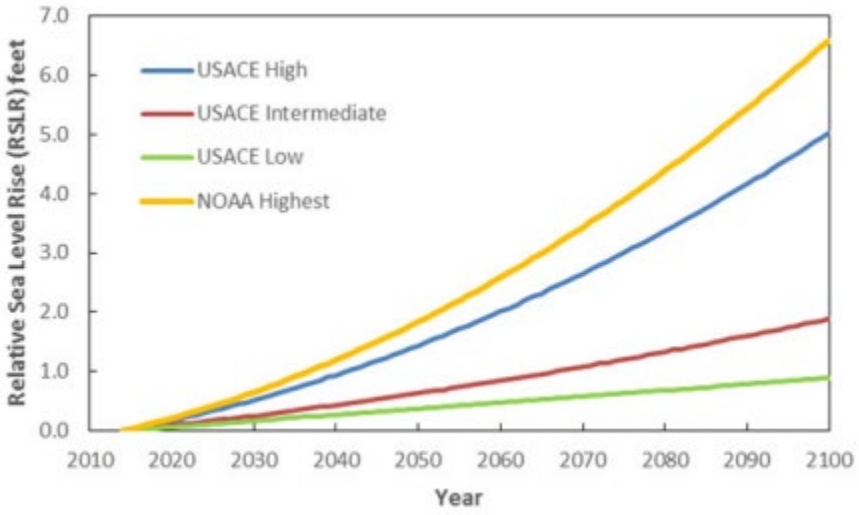
VIA CLIMATE PROJECTIONS AND SCENARIO DEVELOPMENT, CLIMATE CHANGE ADAPTATION PLAN FOR THE DISTRICT OF COLUMBIA, 2015

HEAVIER RAIN



VIA CLIMATE PROJECTIONS AND SCENARIO DEVELOPMENT, CLIMATE CHANGE ADAPTATION PLAN FOR THE DISTRICT OF COLUMBIA, 2015

HIGHER SEAS, MORE FLOODING



VIA CLIMATE PROJECTIONS AND SCENARIO DEVELOPMENT, CLIMATE CHANGE ADAPTATION PLAN FOR THE DISTRICT OF COLUMBIA, 2015

Feb. 2018 NOAA report:

- By 2100, high tide flooding will become or exceed on average ‘every other day’ flooding under an “Intermediate Low” scenario
- By 2100, high tide flooding will become ‘daily’ flooding under “Intermediate” scenarios

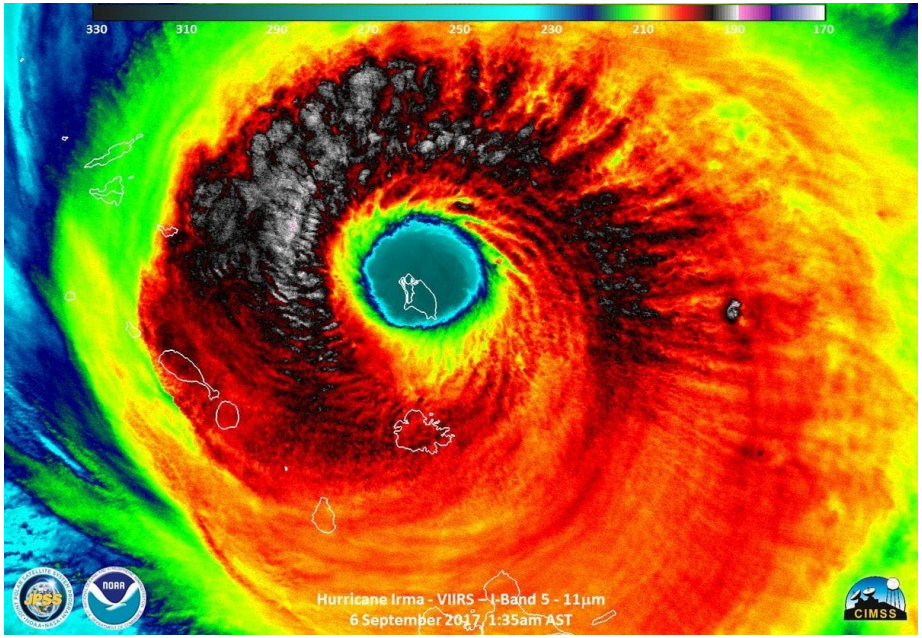
“Today’s flood will become tomorrow’s high tide.”


CLIMATE
CENTRAL
WASHINGTON D.C.
If we cut pollution sharply

STRONGER HURRICANES?

Main projections

- Heavier rainfall over larger area
- Somewhat stronger winds (half category increase by end of century)
- More “rapid intensification”
- Higher storm surge due to higher seas
- Little change in overall frequency



Some conclusions

- Carbon dioxide and other heat-trapping gases are accumulating in the atmosphere
- The planet is warming and is almost certain to warm more
- D.C.’s climate is warming and is almost certain to warm more
  - More hot days, heavier rain, and higher seas in the future
- We will need to plan for and adapt to changes
- Reducing emissions of greenhouse gases will lower risk of the worst, unwelcome changes

Thank you!

Contact

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